10/3,AB/3 (Item 3 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

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Synthesis of human erythropoietin **in vivo in the oviduct of laying hens by localized in vivo gene transfer using electroporation.**
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Poult Sci (UNITED STATES) Feb 1998, 77 (2) p299-302, ISSN 0032-5791
Journal Code: PG3
Languages: ENGLISH
Document type: JOURNAL ARTICLE
In order to synthesize human **erythropoietin** protein in the oviduct of laying hens, localized in vivo gene transfer was attempted by using electroporation. In Experiment 1, transcriptional activities were compared by using four viral and cellular promoters, i.e., the 1.35-kbp long ovalbumin promoter, SV40 early promoter, Rous sarcoma virus long terminal repeat (RSV LTR), and the miw promoter, which is a hybrid of RSV LTR and **chicken** beta-actin promoter. These promoters were fused immediately upstream to the chloramphenicol acetyltransferase reporter gene. The results of chloramphenicol acetyltransferase activity showed that the miw promoter was the strongest, followed by SV40, RSV LTR, and the ovalbumin promoter in decreasing order. The intensity of the miw promoter was 250 times as high as that of the ovalbumin promoter. In Experiment 2, plasmid DNA containing the human **erythropoietin** gene, driven either by the ovalbumin promoter or the miw promoter, was transfected in vivo, and the production of human **erythropoietin** protein was detected by ELISA. The results indicated that the synthesis of human **erythropoietin** protein was attained in the **chicken** oviduct, and its concentration was higher when driven by the miw promoter than the ovalbumin promoter.